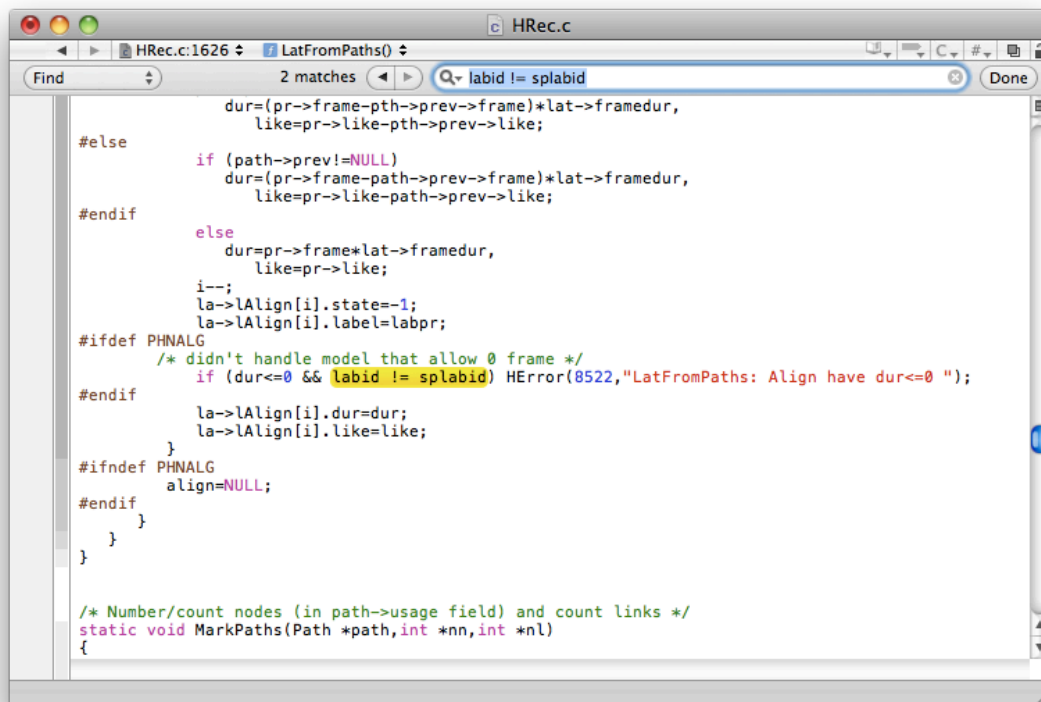


How to install FAAValign/Forced Alignment on ~~your computer~~ a Mac:

1. Install **XCode**. You can download it from <http://developer.apple.com/xcode/> (You have to register as an Apple Developer first, but it's free.)¹
2. Download **HTK 3.4.1** (yes, the latest version!) from <http://htk.eng.cam.ac.uk/> (Again, you have to register, but it's free.)
If you're using a Mac, or are running Linux, the file you want is *HTK-3.4.1.tar.gz* (under "Linux/Unix downloads", or "Browse HTK software archive"); ~~if you're using Windows, get HTK-3.4.1.zip (under "Windows downloads", or "Browse HTK software archive").~~²
3. Unpack the file. You will see a folder called *htk*.
4. Open the file *HRec.c* in *htk/HTKLib* (preferably with XCode or any other editor that has syntax highlighting – this makes the code a lot easier to read). Search ([CMD] + [F]) for the second instance of "**labid != splabid**" in the code:



¹ (Actually, you don't really need the whole XCode thing, but you definitely need a **C compiler** such as **gcc**.)

UPDATE – June 2012: Apparently XCode no longer installs gcc as part of its default installation package under Lion. If that is the case for you, open XCode, go to "Preferences...", select the "Downloads" tab, and click on the "Install" button for "Command line tools".

² I have not installed HTK on a Windows machine yet, so all the following instructions are for a Mac.

Change this to **"labpr != splabid"**.³ (This allows "sp" – small pause – segments to have zero duration.) Save your changes and close the file.

5. Open a terminal, and use the "cd" command to go into the *htk* folder. (If that folder is sitting in your *Downloads* folder, the command would be `cd Downloads/htk`).
6. By default, HTK wants to install its files in */usr/local/bin*.⁴ Check that a directory */usr/local* exists already (by typing in `cd /usr` into the terminal; then `ls -l` to list the contents of */usr*); you might run into problems otherwise.
7. `cd` back to the *htk* folder. Run `./configure` from the terminal if you do have a */usr/local* directory on your machine; otherwise, type in `./configure --prefix=/usr`. (This will install all HTK files directly in */usr/bin*).

You will see a long list of "Checking for..." messages flashing by on the terminal, followed by a final "HTK is now ready to be installed" message:

```

Terminal — bash — 95x42
checking for pow... yes
checking for socket... yes
checking for sqrt... yes
checking for strchr... yes
checking for strcspn... yes
checking for strrchr... yes
checking for strspn... yes
checking for strstr... yes
checking for strtol... yes
checking build system type... i386-apple-darwin10.7.0
checking host system type... i386-apple-darwin10.7.0
configure: creating ./config.status
config.status: creating HTKLib/Makefile
config.status: WARNING:  HTKLib/Makefile.in seems to ignore the --datarootdir setting
config.status: creating HTKTools/Makefile
config.status: WARNING:  HTKTools/Makefile.in seems to ignore the --datarootdir setting
config.status: creating HLMLib/Makefile
config.status: WARNING:  HLMLib/Makefile.in seems to ignore the --datarootdir setting
config.status: creating HLMTTools/Makefile
config.status: WARNING:  HLMTTools/Makefile.in seems to ignore the --datarootdir setting
config.status: creating HTKLVRec/Makefile
config.status: WARNING:  HTKLVRec/Makefile.in seems to ignore the --datarootdir setting
config.status: creating Makefile
config.status: WARNING:  Makefile.in seems to ignore the --datarootdir setting
*****

HTK is now ready to be built.

Type "make all" to build the HTK libraries
and tools.

Then "make install" to install them.

The tools will be installed in /usr/bin

Build notes: Language Modelling tools will be
built. HDecode will not be built. You can build it
manually later by running 'make hdecode
install-hdecode'

*****
esa011:htk ingridrosenfelder$

```

³ Not my stroke of genius. Keelan Evanini discovered this.

⁴ The following is what is outlined in the "README" file, with a few additional comments and suggestions by me.

8. Type `make all` into the terminal. Lots of lines beginning with “gcc...” to follow; interspersed with a variety of warning messages. Do not freak out if this looks like complete gibberish to you; it’s fine.⁵
9. Type `make install` into the terminal. If this gives you a long list of “Permission denied” messages on the first try, repeat with `sudo make install`. You will be prompted for a password, which should be your administrator password. More strange messages to follow.
10. You might not guess it from the look of it, but you have now **successfully installed HTK!**
Type e.g. `HVite` into the terminal and see what happens. If you get a message about the program’s usage, including a loooong list of options, everything is fine.
If you want to check where your HTK files ended up, type in something like `which HVite`. The answer should be “/usr/local/bin/HVite”, if you installed HTK with just `./configure`; if you used the `--prefix=/usr` option, it should be “/usr/bin/HVite”.
11. Download **SoX** (Sound eXchange) from <http://sox.sourceforge.net/>. As of this writing, the latest version is *sox-14.3.2-macosx.zip*. Unzip the file and drag the resulting folder *sox-14.3.2* to wherever you want it on your computer. (The */Applications* directory might be a good place.)
12. **Add sox to the path of your shell:** In Terminal, go to your home directory: `cd ~`. List all files in it, including hidden files, by typing `ls -la`. Check whether a `.bash_login` (or `.bash_profile`) file is listed. If not, create the empty file by typing `touch .bash_login`.
Open the file (`open .bash_login`) and add a “`PATH=$PATH:path_to_sox`” line to the file (where *path_to_sox* is the absolute path to the executable *sox* on your computer).
For example, if you put the *sox-14.3.2* folder into your */Applications* folder, the line you want to add to the file is

```
PATH=$PATH:/Applications/sox-14.3.2
```

⁵ **UPDATE for OS X 10.8 (Mountain Lion):** You might run into the following problem:
If the compiler cannot find the X11 header files (this will happen when you run `make all`, after `./configure`):

- install X11 from XQuarks (or somewhere else...)
- search for the missing header files via Spotlight (I found them in “/opt/X11/include/X11/”)
- re-run `./configure` with the CFLAGS option:
`./configure --prefix=/usr CFLAGS="$CFLAGS -I/opt/X11/include/”`
- after this, keep going as usual, i.e.
`make all`
`make install` (or `sudo make install`)

Save the file and close it. Close the terminal and open a new one. To check whether sox is in your path now, type in `sox` or `which sox`. You should get another looooong reply of usage and options (in the first case), or the path to your sox executable (e.g. `/Applications/sox-14.3.2/sox`).

13. Install **FAAValign**: Unzip the *FAAValign_Toolkit.zip* folder and move it to wherever you want it on your computer.

Yay! Now you're ready to go!!!